

ABSTRACT

Recombinant proteins derived from hepatocyte growth factor (HGF) and macrophage stimulating protein (MSP) comprising two super domains separated by a spacer sequence are disclosed. The recombinant proteins are obtained by combining the hairpin loop (HL) and kringle (K1-K4) domains of HGF and/or MSP α chains, according to general formula (I):

$$[A] - B - [C] - (D)y \quad (I)$$

in which [A] corresponds to the sequence $(LS)_m$ -HL-K1-(K2)_n-(K3)_o-(K4)_p, B is the sequence $[(X)_q Y]_r$, [C] corresponds to the sequence HL-K1-(K2)_s-(K3)_t-(K4)_u, D is the sequence W-Z, and y is 0 or 1. The recombinant proteins are useful for preventing or treating the toxic side effects of chemotherapy, and reducing cell damage induced by other types of drugs.